

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of MUSA et al.	Attorney Docket # 1861D
Serial #	Examiner: Paul Michl
Filing Date:	Group Art Unit: 1714
Title: Die Attach Adhesives with Vinyl Ether and Carbamate or Urea Functionality	Date of this paper: 07 August 2001

Assistant Commissioner of Patents  
Washington, DC 20231

Sir:

PRELIMINARY AMENDMENT

Kindly enter the following amendments to the application.

IN THE SPECIFICATION:

Change the Title to:

DIE ATTACH ADHESIVES WITH VINYL ETHER  
AND UREA FUNCTIONALITY.

After the Title and before the Field of the Invention add: "This application is a divisional of application serial number 09/573,303."

Delete from the Field of the Invention the words: "either carbamate, thiocarbamate or".

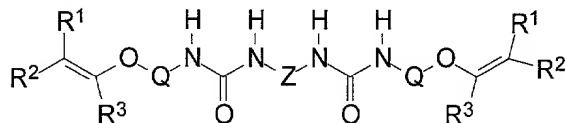
Change the Abstract of the Invention to read: "Compounds with both vinyl ether and urea functionality are suitable for use in microelectronics applications."

IN THE CLAIMS:

Cancel claims 1 to 5 and 8.

Amend claims 6 and 7 and add new claim 9 as follows:

6. [A] The vinyl ether compound according to claim 9 having the structure:



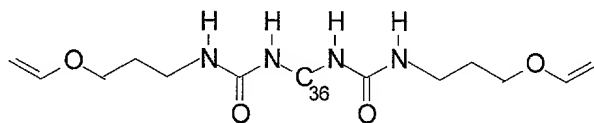
in which

$R^1$ ,  $R^2$ , and  $R^3$  are independently hydrogen, a methyl group, or an ethyl group;

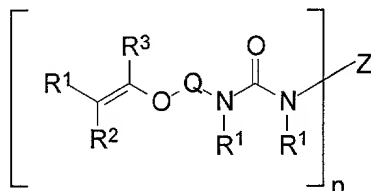
Q is an alkyl or alkylenoxy linear or branched chain having 1 to 12 carbon atoms;

Z is a branched or linear alkane, which may contain cyclic moieties, a siloxane, a polysiloxane, a  $C_1$  to  $C_4$  alkoxy-terminated siloxane or polysiloxane, a polyether, a polyester, a polyurethane, a poly(butadiene), or an aromatic, polyaromatic, or heteroaromatic group.

7. The vinyl ether compound according to claim [5] 9 having the structure



in which  $C_{36}$  is a mixture of isomers of a 36 carbon linear or branched chain.

[illegible]

n is 1 to 6;

Q is an alkyl or cycloalkyl linear or branched chain having 1 to 12 carbon atoms, an alkenoxy chain having 1 to 12 carbon atoms, or aromatic or fused ring system having 3 to 10 carbon atoms and optionally containing the atoms O, N or S;

REMARKS

Respectfully submitted

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~~CARBAMATE OR UREA FUNCTIONALITY~~  
insert <sup>5</sup> > This application is a divisional of application serial number 09/573,303.

## COMPOUNDS

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## 15

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There exist electron acceptor/donor adhesives that contain vinyl ethers as the donor compounds for use in low modulus adhesives, particularly in fast-cure adhesives for die attach applications. However, die attach adhesives containing commercially available vinyl ethers frequently suffer from poor adhesion, resin bleed and voiding due to the volatility and non-polar nature of these commercial vinyl ethers. Thus, there is a need for improved die attach adhesives utilizing vinyl ethers containing polar functionality in order to address these performance issues.

## 25

This invention relates to die attach adhesive compositions containing resins that have vinyl ether and polar functionality, such as a carbamate, thiocarbamate or urea functionality, on a molecular (small molecule) or

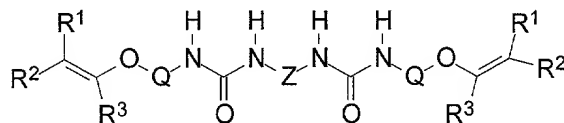
ABSTRACT OF THE INVENTION

Compounds with both vinyl ether and ~~carbamate, thiocarbamate or~~  
urea functionality are suitable for use in microelectronics applications, and  
5 ~~show enhanced adhesive strength compared to compounds that do not~~  
~~contain carbamate, thiocarbamate or urea functionality.~~

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CLAIMS  
MARKED-UP VERSION SHOWING CHANGES MADE

6. ~~The~~ <sup>the</sup> vinyl ether compound <sup>according to claim 9</sup> having the structure:  
A



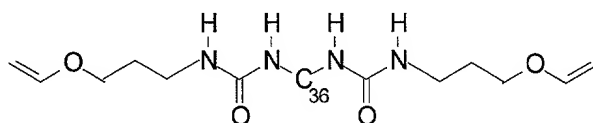
in which

$R^1$ ,  $R^2$ , and  $R^3$  are independently hydrogen, a methyl group, or an ethyl group;

Q is an alkyl or alkyleneoxy linear or branched chain having 1 to 12 carbon atoms;

Z is a branched or linear alkane, which may contain cyclic moieties, a siloxane, a polysiloxane, a  $C_1$  to  $C_4$  alkoxy-terminated siloxane or polysiloxane, a polyether, a polyester, a polyurethane, a poly(butadiene), or an aromatic, polyaromatic, or heteroaromatic group.

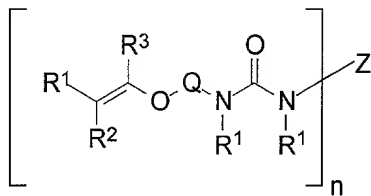
7. The vinyl ether compound according to claim ~~8~~ <sup>9</sup> having the structure



in which  $C_{36}$  is a mixture of isomers of a 36 carbon linear or branched chain.

new

9. A vinyl ether compound having the structure:



in which

$n$  is 1 to 6;

$\text{R}^1$ ,  $\text{R}^2$ , and  $\text{R}^3$  are hydrogen, methyl or ethyl;

$\text{Q}$  is an alkyl or cycloalkyl linear or branched chain having 1 to 12 carbon atoms; an alkylenoxy chain having 1 to 12 carbon atoms, or aromatic or fused aromatic ring having 3 to 10 carbon atoms and optionally containing the heteroatoms O, N or S;

$\text{Z}$  is a branched or linear alkane, which may contain cyclic moieties, a siloxane, a polysiloxane, a  $\text{C}_1$  to  $\text{C}_4$  alkoxy-terminated siloxane or polysiloxane, a polyether, a polyester, a polyurethane, a poly(butadiene), or an aromatic, polyaromatic, or heteroaromatic group.